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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/936,618	03/05/2002	Norio Maeda	33093M006	9087

7590 05/17/2006

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EXAMINER

LU, JIPING

ART UNIT	PAPER NUMBER
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3749

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/936,618		MAEDA ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Jiping Lu		3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 February 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 5-12, 14-24 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-12, 14-20, 22-24 and 26-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 20, last paragraph, applicants claim a device for drying substrates having a number of nozzles that is determined in response to a size of the substrates. However, the specification failed to disclose how to determine the number of nozzles in response to a size of the substrates. No example was given in the specification for determining the number of nozzles based on the size of the substrates and the pitch of the substrates. Without undue experiments, one skilled in the art would not be able to determine the number of nozzles. To overcome this rejection, the applicant must explain as how the number of nozzles was determined and in response to the size of the substrates. Is there a mathematical formula? Is there a control device to automatically adjust the number of nozzles in response to the substrate's size? Is this merely a mental step?

***Claim Rejections - 35 USC § 102***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 10-12, 14, 17, 22-24, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferrell (U. S. Pat. 5,653,045).

Ferrell teaches an apparatus of drying substrate comprising a processing vessel 602 for holding substrates 601 at an angle of 0 degrees with respect to vertical in the processing vessel 602, means (not numbered, see Fig. 6) for supporting substrates 601 within the processing vessel 602, means 618, 620 for continuously lowering a fluid face of the cleaning fluid 622 within the processing vessel with respect to the substrate, means 606 for introducing a drying fluid 607 under a liquid condition within the processing vessel using a nozzle 610 to form individual liquid drops of a drying fluid 607, and means 612, 614 for supplying inert gas into the processing vessel same as claimed. The drying fluid 607 was introduced at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid. The fluid face 622 of the cleaning fluid was lowered with respect to the substrate and the vessel 602 was purges with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. Means 612, 614 is capable of supplying inert gas into the processing vessel during exhausting of the cleaning fluid from the processing vessel. Means 612, 614, 620, 622 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the drying fluid 607 such that a liquid layer greater than a predetermine thickness (e.g. zero thickness) is continuously maintained. Claims did not define what that predetermined thickness is.

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5. Claims 1, 3, 5, 7-10, 12, 14, 17, 22, 23 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Mohindra et al. (U. S. Pat. 5,772,784).

Patent to Mohindra et al. shows a method and device for drying substrates comprising housing substrates 244 within a processing vessel 240 containing DI water, supporting the substrate within the processing vessel by supporting means 248, lowering the fluid face of the DI water through drain region 231 by drain valve 236, introducing drying fluid through nozzle 306 and supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed. Means 231, 236, 248 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the cleaning fluid DI such that a liquid layer greater than a predetermine thickness (e.g. zero thickness) is continuously maintained. Claims did not define what that predetermined thickness is.

#### ***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-3, 5, 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat. 4,816,081).

Ferrell teaches a method of drying substrates comprising holding substrates 601 at an angle of 0 degrees with respect to vertical in a processing vessel 602, purging vessel 602 with nitrogen, introducing a cleaning fluid 622, using low pressure nitrogen and nozzle 610 to form

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individual liquid drops of a drying fluid 607, introducing drying fluid 607 at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid, lowering the fluid face 622 of the cleaning fluid with respect to the substrate and purging the vessel 602 with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. However, Ferrell does not teach supplying inert gas into the processing vessel during exhausting the cleaning fluid from the processing vessel. Mohindra et al. teach a concept of supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed. Mehta et al. teach a concept of supplying inert gas into the processing vessel during exhausting of the cleaning liquid from the processing vessel (col. 6, lines 24-30) same as claimed. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate drying method of Ferrell to include a step of supplying inert gas into the processing vessel during exhausting of the cleaning fluid from the processing vessel as taught by Mohindra et al. or Mehta et al. in order to improve the drying efficiency. With regard to the newly added predetermined thickness, Ferrell's means 612, 614, 620, 622 is capable to continuously maintain the liquid layer of the drying fluid for continuously lowering a fluid face of the drying fluid 607 such that a liquid layer greater than a predetermine thickness (e.g. zero thickness) is continuously maintained. Claims did not define what that predetermined thickness is.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat.

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4,816,081) as applied to claim 1 as above, and further in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying method of Ferrell as modified by Mohindra et al. or Mehta et al. as above includes all that is recited in claim 6 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the drying method of Ferrell to include a step of supporting the substrates at multiple positions as taught by Fung et al. in order to improve the drying efficiency.

9. Claims 15-16, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying device of Ferrell as above includes all that is recited in claims 15-16 and 26-27 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the substrate holders 12 and 24 of Fung et al. for the substrate support member of Ferrell in order to support substrates in multiple positions and to reduce water spots left on the substrate after drying.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Takase et al. (U. S. Pat. 6,152,153).

The substrate drying device of Ferrell as above includes all that is recited in claim 18 except for moving the nozzle closer to the substrate after it has been removed from the cleaning solution. Takase et al. teaches a concept of moving the nozzles across and toward the substrate for more precise directing of the drying fluid (col. 10, lines 42-63 and Figures 9 and 10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to include moving nozzles as taught by Takase et al. in order to more precise directing of the drying fluid and to improve the drying efficiency.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Taniyama et al. (U. S. Pat. 6,247,479).

The substrate drying device of Ferrell as above includes all that is recited in claim 19 except for the circulation means for the liquid components. Taniyama et al. teaches a concept of using circulation means for keeping liquids for substrate treatment purified and leading to less contaminants on the finished substrate (co. 7, lines 27-49 and Figure 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to circulation means as taught by Taniyama et al. in order to keep liquids for substrate treatment purified and to reduce contaminants on the finished substrate.

***Allowable Subject Matter***

12. Claim 21 is allowed.



***Response to Arguments***

13. Applicant's arguments filed 02/24/2006 have been fully considered but they are not persuasive to overcome the rejection. First, broad claims fail to define over the prior art references. Please point out from the claims, if there is any limitation that the prior art references do not show or teach. Second, on page 9 of the Remarks, the applicant merely argued that the present disclosure would enable one skilled in the art to determine the number of nozzles needed based on the size of the substrates. However, the applicant still failed to expressly explain as how the number of nozzles was determined by the size of substrates. Does that mean the larger the size of the substrates will require more nozzles. This is a common sense approach. Third, on page 10 of the Remarks, the applicant argued that the patent to Ferrell and Mohindra et al do not teach the supply of liquid onto the cleaning fluid and the control of inert gas to maintain the predetermined thickness of drying fluid. The examiner disagrees. Ferrell patent shows means 612, 614, 620, 622 capable of continuously maintaining the liquid layer of the drying fluid for continuously lowering a fluid face of the drying fluid 607 such that a liquid layer greater than a predetermined thickness (e.g. zero thickness) is continuously maintained. Claims did not define what that predetermined thickness is. It may be zero thickness. With regard to Mohindra et al patent, the means 231, 236, 248 is also capable of continuously maintaining the liquid layer of the drying fluid for continuously lowering a fluid face of the cleaning fluid DI such that a liquid layer greater than a predetermined thickness (e.g. zero thickness) is continuously maintained. Claims did not define what that predetermined thickness is. It may be zero. Finally, in pages 11-12 of the Remarks, the applicant also argued that the secondary references as applied against the claims under 35 USC 103 also fail to teach the newly added limitation regarding "predetermined

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thickness". The examiner remains in disagreement with the applicant for the rejection as stated above.

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

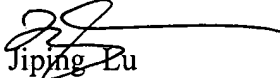
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiping Lu whose telephone number is 571 272 4878. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, EHUD GARTENBERG can be reached on 571 272-4828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jiping Lu  
Primary Examiner  
Art Unit 3749

J. L.